# A fuel consumption study of Stata's auto dataset

We conduct a study of the fuel consumption of cars in Stata's auto dataset.

. sysuse auto, clear
(1978 Automobile Data)

## Perform data transformation

We generate a variable, **fuel**, that measures the fuel consumption rate in the unit of Gallons per 100 Miles.

. generate fuel = 100/mpg

. label variable fuel "Fuel consumption (Gallons per 100 Miles)"

## Examine the variables

We examine variables for possible errors in the data.

. describe fuel weight

 storage display value
variable name type format label variable label
--------------------------------------------------------------------------------
fuel float %9.0g Fuel consumption (Gallons per 100
 Miles)
weight int %8.0gc Weight (lbs.)

. summarize weight

 Variable | Obs Mean Std. Dev. Min Max
-------------+---------------------------------------------------------
 weight | 74 3019.459 777.1936 1760 4840

The variable **weight** has minimum value 1760.00, maximum value 4840.00, and range 3080.00.

## Plot fuel consumption and vehicle weight

. scatter fuel weight, mcolor(blue%50)



scatter fuel weight

## Explore relationship between fuel consumption and vehicle weight - linear regression

. regress fuel weight

 Source | SS df MS Number of obs = 74
-------------+---------------------------------- F(1, 72) = 194.71
 Model | 87.2964969 1 87.2964969 Prob > F = 0.0000
 Residual | 32.2797639 72 .448330054 R-squared = 0.7300
-------------+---------------------------------- Adj R-squared = 0.7263
 Total | 119.576261 73 1.63803097 Root MSE = .66957

------------------------------------------------------------------------------
 fuel | Coef. Std. Err. t P>|t| [95% Conf. Interval]
-------------+----------------------------------------------------------------
 weight | .001407 .0001008 13.95 0.000 .001206 .0016081
 \_cons | .7707669 .3142571 2.45 0.017 .1443069 1.397227
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The regression shows that for every unit increase in weight, a 0.0014 unit increase in fuel consumption is predicted.